

WHAT IS CLAIMED IS:

1. A winter wheat-derived chitinase cDNA, characterized in that said cDNA has a nucleotide sequence corresponding to an amino acid sequence listed as SEQ. ID. No.1 in Fig. 1.
2. A winter wheat-derived chitinase cDNA according to claim 1, characterized in that said cDNA comprises 771 nucleotides/256 amino acids and has 98% identity (on amino acid sequence level) with barley-derived chitinase cDNA.
3. A winter wheat-derived chitinase cDNA according to claim 1, characterized in that said cDNA encodes a protein with chitinase activity in low temperature environment and confers plant disease resistance by digestion of chitin, one of the major components of fungus cell wall.
4. A winter wheat-derived chitinase cDNA, characterized in that said cDNA has a nucleotide sequence corresponding to an amino acid sequence listed as SEQ. ID. No.2 in Fig. 2.
5. A winter wheat-derived chitinase cDNA according to claim 4, characterized in that said cDNA comprises 972 nucleotides/323 amino acids and has 68% identity (on amino acid sequence level) with rye-derived chitinase cDNA.

6. A winter wheat-derived chitinase cDNA according to claim 4, characterized in that said cDNA encodes a protein with chitinase activity in low temperature environment and confers plant disease resistance by digestion of chitin, one of the major components of fungus cell wall.

7. A winter wheat-derived chitinase cDNA, characterized in that said cDNA has a nucleotide sequence corresponding to an amino acid sequence listed as SEQ. ID. No. 3 in Fig. 3.

8. A winter wheat-derived chitinase cDNA according to claim 7, characterized in that said cDNA comprises 960 nucleotides/319 amino acids and has 95% identity (on amino acid sequence level) with spring wheat-derived chitinase cDNA.

9. A winter wheat-derived chitinase cDNA according to claim 7, characterized in that said cDNA encodes a protein with chitinase activity in low temperature environment and confers plant disease resistance by digestion of chitin, one of the major components of fungus cell wall.

10. A method of isolating a winter wheat-derived chitinase cDNA having a nucleotide sequence corresponding to an amino acid sequence listed as SEQ. ID. No. 1 in Fig. 1, a winter wheat-derived chitinase cDNA having a nucleotide sequence corresponding to an amino acid sequence listed as SEQ. ID. No. 2

in Fig. 2, a winter wheat-derived chitinase cDNA having a nucleotide sequence corresponding to an amino acid sequence listed as SEQ. ID. No. 3 in Fig. 3, said method comprising the steps of:

extracting mRNA from winter wheat variety PI173438 (having high snow molds resistance) that has undergone a sufficient hardening process;

preparing cDNA and a cDNA library based on said mRNA;

analyzing nucleotide sequences of a number of plant-derived chitinase cDNAs which have all been published by EMBL/Genebank/DDBJ DNA Databank;

designing a pair of chitinase cDNA-specific degenerated primers with reference to highly conserved nucleotide sequence portions of the plant-derived chitinase cDNAs;

conducting PCR (polymerase chain reaction) using a pair of chitinase cDNA-specific degenerated primers and using said cDNA as a template, thereby amplifying fragments of chitinase cDNAs and obtaining amplified DNA fragments; and

using said amplified DNA fragments as probes for screening said cDNA library by a hybridization assay, to isolate recombinant plaques containing full length cDNA.

11. The method according to claim 10, wherein one of said a pair of chitinase cDNA-specific degenerated primers has the following nucleotide sequence:

(Forward): 5' C-A-C-G-A-G-A-C-C-A-C-N-G+G-C-G-G-N-T-G-G-G-C

(SEQ. ID. No. 4),

and the other has the following nucleotide sequence:

(Reverse): 5' A-C-N-A-A-T-A-T-C-A-T-C-A-A-C-G-G-C-G-G

(SEQ. ID. No. 5).

add
S1'